

Unit 3 Practice Test

Calculations

$$1) (27.977 \times .9221) + (28.976 \times .0470) + (29.974 \times .0309) = 28.1 \text{ amu}$$

$$2) \frac{2.90 \text{ g Fe}}{55.85 \text{ g Fe}} \times \frac{1 \text{ mol Fe}}{1 \text{ mol Fe}} \times \frac{6.022 \times 10^{23} \text{ atoms}}{1 \text{ mol Fe}} = \frac{3.127 \times 10^{22} \text{ atoms Fe}}{2.60 \times 10^{13} \text{ cells}} = 1.20 \times 10^9 \text{ atoms/cell}$$

$$3) \frac{56.6 \text{ g NH}_3}{17.034 \text{ g NH}_3} \times \frac{1 \text{ mol NH}_3}{1 \text{ mol NH}_3} \times \frac{6.022 \times 10^{23} \text{ molecules}}{1 \text{ mol NH}_3} = 2.00 \times 10^{24} \text{ molecules}$$

$$4) \frac{35.0 \text{ g H}_2\text{S}}{34.08 \text{ g H}_2\text{S}} \times \frac{1 \text{ mol H}_2\text{S}}{1 \text{ mol H}_2\text{S}} = 1.03 \text{ mol H}_2\text{S}$$

$$5) \frac{12.8 \text{ g}}{.256 \text{ mol}} = 50.0 \text{ g/mol} = \text{CH}_3\text{Cl}$$

$$6) \frac{1.008 \text{ g H}}{63.02 \text{ g HNO}_3} \times 100 = 1.60\% \text{ H}$$

$$7) \frac{103 \text{ g Ca}_3(\text{PO}_4)_2}{310.18 \text{ g}} \times \frac{1 \text{ mol}}{1 \text{ mol}} \times \frac{2 \text{ mol H}_3\text{PO}_4}{1 \text{ mol Ca}_3(\text{PO}_4)_2} \times \frac{97.99 \text{ g}}{1 \text{ mol}} = 65 \text{ g H}_3\text{PO}_4$$

$$\frac{75 \text{ g H}_2\text{SO}_4}{98.08 \text{ g H}_2\text{SO}_4} \times \frac{1 \text{ mol}}{1 \text{ mol}} \times \frac{2 \text{ mol H}_3\text{PO}_4}{3 \text{ mol H}_2\text{SO}_4} \times \frac{97.99 \text{ g}}{1 \text{ mol}} = 50 \text{ g H}_3\text{PO}_4$$

$$10) \frac{.35 \text{ g NaHCO}_3 \mid 48.00 \text{ g O}}{84.01 \text{ g NaHCO}_3} = 0.20 \text{ g Oxygen}$$

$$12) \frac{63.6 \text{ g Re} \mid 1 \text{ mol Re}}{186.21 \text{ g Re}} = \frac{.3415 \text{ mol Re}}{.3415} = 1$$

$$\frac{36.4 \text{ g Cl} \mid 1 \text{ mol Cl}}{35.45 \text{ g Cl}} = \frac{1.027 \text{ mol Cl}}{.3415} = 3 \quad \text{ReCl}_3$$

$$13) 12.01 + 1.008 + 35.45 = 48.468 \text{ g/mol}$$

$$\frac{290.8}{48.468} = 6$$

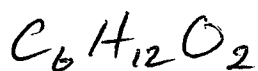
$$15) \frac{2.58 \text{ g H}_2\text{O} \mid 2.016 \text{ g H}}{18.016 \text{ g H}_2\text{O}} = \frac{.2887 \text{ g H} \mid 1 \text{ mol H}}{1.008 \text{ g H}} = \frac{.286 \text{ mol H}}{.0479} = 6$$

$$\frac{6.32 \text{ g CO}_2 \mid 12.01 \text{ g C}}{44.01 \text{ g CO}_2} = \frac{1.725 \text{ g C} \mid 1 \text{ mol C}}{12.01 \text{ g C}} = \frac{.144 \text{ mol C}}{.0479} = 3$$

$$= \frac{.7663 \text{ g O} \mid 1 \text{ mol O}}{16.00 \text{ g O}} = \frac{.0479 \text{ mol O}}{.0479} = 1$$

empirical formula = $\text{C}_3\text{H}_6\text{O}$ (mass = 58.08 g/mol)

molecular formula is between 100-150 so it must be double





$$\frac{125g C_2H_4}{28.05g} \times \frac{1mol}{1mol} \times \frac{2mol CO_2}{1mol C_2H_4} \times \frac{44.01g}{1mol} = 392.2g CO_2$$

20. $\frac{1mol Fe}{2mol Fe} \times \frac{3mol CO}{2mol CO} \times \frac{1mol O_2}{1mol O_2} = .75mol O_2$

21. $\frac{1mol C_6H_{12}O_6}{1mol C_6H_{12}O_6} \times \frac{2mol C_2H_5OH}{1mol} \times \frac{46.07g}{1mol} = 92.14g C_2H_5OH$

$$\frac{46g}{92.14g} \times 100 = 50\% \text{ yield}$$